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Differences in pain coping between Black and White Americans: A meta-analysis

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Abstract

Compared to White individuals, Black individuals experience greater pain across clinical and experimental modalities. These race differences may be due to differences in pain-related coping. Several studies examined the relationship between race and pain coping; however, no meta-analytic review has summarized this relationship or attempted to account for differences across studies. The goal of this meta-analytic review was to quantify race differences in the overall use of pain coping strategies as well as specific coping strategies. Relevant studies were identified using electronic databases, an ancestry search, and by contacting authors for unpublished data. Of 150 studies identified, 19 met inclusion criteria, resulting in 6489 participants and 123 effect sizes. All of the included studies were conducted in the United States. Mean effect sizes were calculated using a random effects model. Compared to White individuals, Black individuals used pain coping strategies more frequently overall (d=0.25, p<0.01), with the largest differences observed for praying (d=0.70) and catastrophizing (d=0.40). White individuals engaged in task persistence more than Black individuals (d=−0.28). These results suggest that Black individuals use coping strategies more frequently, specifically strategies associated with poorer pain outcomes. Future research should examine the extent to which the use of these strategies mediates race differences in the pain experience.

Perspective—Results of this meta-analysis examining race differences in pain related coping indicate that, compared to White individuals, Black individuals use coping strategies more frequently, specifically those involving praying and catastrophizing. These differences in coping may help to explain race differences in the pain experience.

Keywords

pain; coping; race

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1. Introduction

Chronic pain affects approximately 100 million Americans and is associated with $635 billion in annual medical treatment and lost productivity [44]. Although differences in the pain experience have been documented across many racial and ethnic groups, most of the literature focuses on differences between Black and White individuals. The current meta-analytic review reflects this focus by examining Black-White differences in pain-related coping. Because racial terminology varies across studies (e.g., Black versus African-American, White versus Caucasian), we will adopt the terms used in the source articles throughout this introduction.

Compared to Caucasians, African Americans report higher levels of pain for a number of conditions including: AIDS, glaucoma, arthritis, post-operative pain, post-spinal fusion pain, and low back pain [8,21,29,80,82,98]. Further, African Americans demonstrate a lower pain tolerance and report higher pain intensity and unpleasantness than non-Hispanic Whites during experimental pain tasks [12,15,24,25,72,81,96,100]. Race differences in clinical and experimental pain may be due to psychosocial factors such as pain coping. Coping is broadly defined as the use of behavioral and cognitive techniques to manage stress [58]. Differences in coping strategy use are associated with differences in pain intensity, adjustment to chronic pain, and psychological and physical functioning [45,46,53]. For example, several studies found that ignoring strategies are associated with less pain, whereas praying and hoping and catastrophizing are associated with higher pain levels.

Individual coping strategies may also be grouped into conceptual categories. The three most common categorizations will be discussed here. One conceptualization of pain coping differentiates cognitive from behavioral strategies. This conceptualization served as the basis for the Coping Strategies Questionnaire (CSQ), a widely used measure of six cognitive (diverting attention, reinterpreting pain, coping self-statements, ignoring pain, praying/hoping, and catastrophizing) and two behavioral (increasing activity level and increasing pain behaviors) coping strategies [75].

Another conceptualization of coping differentiates active from passive strategies. Active coping refers to strategies to control pain or to function in spite of pain by using one's own resources, while passive coping involves relinquishing control of pain to others [10]. Studies have linked active coping strategies to positive affect, better psychological adjustment, and decreased depression, while passive strategies are linked to poor outcomes such as increased pain and depression [11,43]. The Vanderbilt Pain Management Inventory (VPMI) was designed to differentiate active and passive coping strategies. In addition, the strategies measured by the CSQ and Pain Coping Inventory (PCI) can be classified into active and passive categories [10,56;84].

Coping can also be classified into problem-focused versus emotion-focused strategies. Problem-focused approaches involve direct attempts to deal with pain, while emotion-focused approaches involve managing the emotional reactions to pain [30]. There is some evidence suggesting emotion-focused coping is associated with worse pain and functioning in individuals with chronic pain [2;11;27;34].

In a topical review, Edwards and colleagues [24] discussed mechanisms of race and ethnic differences in pain, including differences in pain-related coping. Unfortunately, only one study had examined the relationship between race and pain coping at that time [50], preventing the authors from making strong conclusions. Since their review, a number of studies have examined the relationship between race and pain coping, with inconsistent results, perhaps due to differences in conceptualization of coping across studies. To date, however, no critical or meta-analytic reviews have summarized the relationship between race and pain coping or attempted to account for the differences observed across studies. Further, few studies [31 & 63 are notable exceptions] have examined the interactions between race and other putatively important demographic variables, such as gender and age, which are known to be independently associated with pain [19;63;73;100]. It is reasonable to speculate that the relationship between race and pain coping differs based on gender and age.

The Current Study

The goal of this meta-analytic review was to quantify race differences (Black versus White) in the use of pain coping strategies in order to better understand one possible mechanism of race differences in the pain experience. Such an understanding may inform chronic pain care and support an individually tailored treatment approach. We had the following hypotheses: (1) Black and White individuals would differ in their use of pain coping strategies overall, (2) consistent with the topical review by Edwards and colleagues [24], Black individuals would report using hoping/praying strategies more than White individuals, (3) race differences in coping would vary across different conceptualizations of coping, and (4) the relationship between race and coping would vary across age and gender.

2. Methods

2.1 Search Methods

An exhaustive literature search of published studies was conducted using *PubMed, PsychInfo, PsychArticles, Embase, Ovid*, and *Web of Science* to find articles published through August 2014. Searches were defined by all possible keyword combinations of the terms for and variations of (1) pain, (2) coping, and (3) race. Additional search terms are presented in Table 1. Although different studies used different terms for race, for the sake of clarity, from this point forward we use “Black” and “White”, which are the broadest terms for these racial groups. Following the online search, an ancestry search was employed by inspecting the references sections of relevant articles and related reviews to identify additional studies that could be included. Authors of relevant studies were also contacted via email with a request for unpublished data and were given a one month time period in which to respond.

2.2 Eligibility criteria

Studies were included if they (1) used a self-reported measure of pain-related coping, (2) compared Black and White participants, (3) used an adult sample (over the age of 18), and (4) provided either an effect size representing the relationship between race and coping strategies or directly compared Black and White participants on pain-related coping. Studies

were excluded if they (1) measured non-specific coping that is not pain-related (e.g., coping with a chronic illness such as cancer), (2) used a sample of children, (3) grouped Black participants with other non-White participants, or (4) were not available in English. Each abstract was reviewed by the first author (SMM) to determine eligibility. If eligibility could not be determined from the abstract, the full article was examined. If published studies did not include data in a form that could be coded for the meta-analysis, authors were contacted via email and given a one month time period in which to respond and provide the necessary information. A study flowchart that uses the PRISMA model [66] is included in Figure 1.

2.3 Screening, coding, and requests for missing data

Each article was read and data were extracted and independently coded by two study authors (SMM & MMM) using a standardized coding form. Sample size, type of study, coping questionnaire used, and average effect sizes were coded for each study. The following sample characteristics were also coded in order to analyze potential moderator variables: mean age of the sample, sample age range, and percentage of the sample that was female. Additionally, the following key features of the study were coded: study design, statistic used, individual coping strategies used, and effect sizes for each individual coping strategy. Finally, the categories of each coping strategy (i.e., active or passive, cognitive or behavioral, and problem- or emotion-focused) were coded as potential moderators by two study authors (SMM & MMM) according to categorization conventions used throughout the coping literature [2;10;11;27;34;56;75;84]. Any missing data were coded as such. There was good interrater reliability (K = 0.982) for the categorization coding, and any disagreements were resolved by mutual discussion and, if necessary, adjudication by the senior author (ATH).

2.4 Data analytic approach

The standardized mean difference (*d)* was computed as the effect size for each study and each coping strategy. Positive values for *d* indicated higher values for Black participants, and negative values indicated higher values for White participants. Standardized mean differences (SMDs) were adjusted using Hedge's adjustment to correct for small sample sizes within studies. The Hedge's adjusted mean differences were then weighted using the inverse variance weight for each study to account for differences in sample sizes across studies.

A random effects model was used to calculate SMDs. This model assumes that the true effect size varies from one study to the next, and that studies in this analysis represent a random sample of effect sizes that could have been observed [59]. The random effects model allows for study results to be generalized to wider populations. This was appropriate for the current analyses due to the expected difference in population effect sizes across sample types and the diversity in coping measurement across studies.

For studies that reported multiple effect sizes, an average of the effect sizes (i.e., the overall effect size) was computed. The effect sizes within each study measuring the same associations were averaged to avoid bias. These averaged effect sizes were used to calculate the SMD for each coping strategy. Effect sizes less than 0.20 were considered small, effects sizes of 0.50 were considered medium, and effect sizes larger than 0.80 were considered

large [59]. Heterogeneity of the effect sizes was assessed using the I^2 statistic. The I^2 statistic ranges from 0 to 100%, with increasing values indicative of greater between-study variability [41].

To examine potential publication bias, Orwin's failsafe N [69] was calculated. This statistic indicates the number of unpublished studies with an average effect size of 0 that would be needed to reduce the observed effect size to a negligible magnitude. For this meta-analysis, $d = 0.10$ was determined to be a negligible effect size.

2.7 Moderator Analyses

To test the extent to which continuous variables moderated the effect of race on coping, we conducted weighted meta-regression analyses using a random effects model with method of moments estimation. The following continuous variables were examined as potential moderator variables: (1) age of the sample; and (2) percentage of the sample that is female.

To examine the extent to which race differences in coping varied across coping category, an average of the effect sizes for each categorization was computed for each study in order to avoid bias [59]. These averaged effect sizes were used to calculate the SMD for each category of coping, and the effect sizes were then examined to determine the extent to which the race-coping relationship differed between categories of coping. The following categorical variables were examined as potential moderator variables: (1) cognitive versus behavioral coping strategies; (2) active versus passive coping strategies; and (3) problem- versus emotion-focused coping strategies. See Table 2 for categorizations.

2.8 Statistical Software

Meta-analyses, meta-regression analyses, and modified analyses of variance were conducted using IBM SPSS 22 and macros provided by Wilson [99].

3. Results

3.1 Study Sample

One hundred thirty three records were identified through the initial database search. An additional 16 references were identified through the ancestry search. Of the 16 authors contacted via email for additional data sets, 7 responded and 1 provided an additional unpublished data set. A total of 131 studies were excluded (see Figure 1 for a breakdown of the reasons for exclusion). Two studies did not report sufficient data to calculate effect sizes; however, authors for both studies provided the necessary data upon request, and thus these studies were included in the final sample.

A total of 123 effect sizes from 19 studies were included in this meta-analysis, with an average of 6.3 effect sizes per study (see Tables 3 & 4). These studies used the following self-report measures of coping: Stone and Neale's Daily Coping Inventory (SNDCI) adapted for pain, Pain Catastrophizing Scale (PCS), Coping Strategies Questionnaire (CSQ), Coping Strategies Questionnaire-Revised (CSQ-R), Vanderbilt Multidimensional Pain Coping Inventory (VMPCI), Emotional Approach Coping Scale, and Profile of Chronic Pain: Screen and Extended Assessment. Modified versions of the CSQ, Religious Problem Solving Scale,

and SNDCI were also used, and 1 study used a list of pain reducing behaviors. The majority of studies used some form of the CSQ or CSQ-R (k = 10) or the PCS (k = 5). Although most studies used standard instructions for completing the coping questionnaires, a few studies used situation-specific ("in-vivo") instructions for the CSQ (k = 1) and PCS (k = 4).

The overall sample size was 6,489 participants, including 2,719 Black participants and 3,770 White participants. The mean sample size for included studies was 341.84 participants. The mean age for the samples was 42.4 years (95% C.I.: 32.3, 52.3). Fifty-eight percent of the samples had predominantly female participants (more than 50% female), and 79% of the samples had predominantly White participants (more than 50% White).

3.2 Relationship Between Race and Overall Coping Strategies

The SMD for the relationship between race and overall coping ranged from 0.06 to 0.89. Table 5 includes SMDs for overall coping and specific coping strategies as well as Orwin's failsafe N [69] for each SMD. The SMD for the difference in overall coping between Black and White participants was small but statistically significant ($d = 0.25$, $z = 6.35$, $p < 0.01$, FSN = 29), indicating that Black participants scored higher on measures of pain coping overall than did White participants. The heterogeneity analysis showed that a moderate amount of the total variance ($I^2 = .47$) was due to between study variability.

3.3 Relationship Between Race and Specific Coping Strategies

The race difference in use of hoping and praying was medium-to-large ($d = 0.70$, $z = 6.34$, $p < 0.001$, FSN = 72), indicating that Black participants scored higher on measures of hoping and praying coping strategies than White participants. A considerable portion of variance in this effect ($I^2 = .89$) was accounted for by between study variability, suggesting that additional variables may moderate this relationship.

There was a small-to-medium effect of race on the use of catastrophizing ($d = 0.40$, $z = 5.81$, $p < 0.001$, FSN = 51), indicating that Black individuals scored higher on measures of catastrophic thinking than White individuals. A substantial portion of this effect ($I^2 = .80$) was accounted for by between study variability, suggesting the presence of potential moderators of this effect.

The SMDs indicating race differences in the use of diverting attention ($d = 0.20$), reinterpreting pain ($d = 0.10$), and exercising and stretching ($d = 0.33$) were small but statistically significant, indicating that Black individuals scored higher on measures of each of these strategies than White individuals (see Table 5). The SMD for the race difference in the use of task persistence was also small but statistically significant ($d = -0.28$), however it was in the opposite direction, such that White individuals scored higher on measures of this strategy than Black individuals. The effect sizes for these coping strategies are consistent with their relatively small FSN values (all were ≤ 11; Table 5).

There were not significant differences in the use of coping self statements, ignoring pain, increased behavioral activity, relaxation, and seeking social support.

3.4 Moderation

Mean age of the sample and percentage of the sample that was female were tested as continuous moderators of the relationship between race and overall coping, as well as race and specific coping strategies (see Table 6). Although not a significant moderator for overall coping, age was a significant moderator of the relationship between race and catastrophizing, such that race differences in catastrophizing decreased as the sample age increased ($\beta = -0.64$, $p < 0.01$). Gender was not a significant moderator for overall coping, however, it did moderate the relationship between race and exercising and stretching, such that samples including a higher percentage of females tended to demonstrate larger race differences in exercising and stretching ($\beta = -0.96$, $p = 0.01$).

To examine the extent to which race differences in coping varied across coping category, three types of categorical moderators were examined: (1) active versus passive coping, (2) problem- versus emotion-focused coping, and (3) cognitive versus behavioral coping. There were notable differences in the effect sizes within each of the three coping categories. The SMD between race and coping was larger for passive ($d = 0.53$) versus active ($d = 0.03$), emotion-focused ($d = 0.32$) versus problem-focused ($d = 0.14$), and cognitive ($d = 0.29$) versus behavioral ($d = 0.05$) coping (Table 7).

4. Discussion

The purpose of this meta-analytic review was to quantify the relationship between race and the use of pain coping strategies. Overall, Black individuals reported using pain coping strategies more frequently than White individuals. Specifically, Black individuals engaged in hoping and praying, catastrophizing, diverting attention, and reinterpreting of pain sensations more frequently. Conversely, Whites used task persistence more frequently. The magnitude of the observed race differences was larger for passive versus active strategies, emotion-focused versus problem-focused strategies, and cognitive versus behavioral strategies.

These findings suggest that Black individuals use overall pain-related coping strategies more frequently than do White individuals. This effect was not only driven by significant differences in strategies such as hoping and praying, catastrophizing, and diverting attention, but also by smaller differences in the majority of coping strategies assessed. In fact, White individuals only engaged in task persistence (significant difference) and ignoring strategies (nonsignificant difference) more frequently than Black individuals. Although it seems intuitive that having more tools in one's coping toolbox is preferable to having fewer, the current findings argue against such an assumption. Indeed, Geisser and colleagues found that maladaptive coping was a more important determinant of pain adjustment than was adaptive coping [32]. Because Black individuals use pain-coping strategies more frequently overall, they are also more likely to engage in maladaptive strategies more frequently, which may partly account for their increased pain and impairment compared to White individuals.

Race differences were largest for hoping and praying strategies, with Blacks praying more frequently than Whites in response to pain. This finding is consistent with the central role of the church in many Black communities. Compared to Whites, Blacks attend church more,

read religious materials more, listen to religious programs more, pray more, request prayer from others more, self-identify as more religious, and place higher importance on religion [17]. Thus, it is not surprising that Blacks pray more than Whites in general as well as in response to pain.

Exactly how these differences in hope and prayer are related to race differences in pain remains to be clarified. Hoping and praying, as measured by the CSQ, is a passive coping strategy associated with avoidance [5;65]. Previous research suggests that passive coping and avoidance are related to worse pain and functioning and to increased rates of disability [7;10;65;70;95]. Thus, Blacks' more frequent engagement in a passive type of prayer (e.g., "I pray to God it won't last long") may reduce their ability to manage pain and may lead to poorer pain outcomes. Thus, this effect may not be driven by prayer, per se, but rather by the fact that many studies conceptualize and measure prayer as a passive strategy. Future studies should consider alternative measures of prayer, such as the Prayer Functions Scale [6] or the Multidimensional Prayer Inventory [57], that more broadly conceptualize prayer beyond passive strategies in order to better understand its relationship to pain and its role as a mediator of race differences in pain.

The race difference in catastrophizing was smaller than that for hoping and praying, however, the pattern was the same: Black individuals catastrophize in response to pain more than White individuals. One speculative interpretation of these findings is that the catastrophizing response of Black individuals is related to a more general sense of learned helplessness. The learned helplessness model posits that individuals who perceive that outcomes are uncontrollable suffer motivation, cognitive, and emotional deficits [1]. Studies indicate that Blacks are at increased risk for disparate pain care [37;61;89;90,94]. As a result of this clinical discrimination, Black patients might conclude that no matter what they do, their pain will not be adequately treated. Consequently, they may adopt a catastrophic style of thinking about pain, while White patients who do not face such discrimination continue to seek treatment or engage in new actions to reduce pain and improve function. Future research should examine perceptions of powerlessness and helplessness as potential mechanisms underlying the race differences in pain catastrophizing. Moreover, a closer examination of the individual facets of catastrophizing (i.e., Rumination, Magnification, and Helplessness subscales of the Pain Catastrophizing Scale) will provide a more nuanced understanding of catastrophizing in the context of race, pain, and discrimination.

Catastrophizing may also function to solicit assistance or empathic responses from others, including family, friends, and medical providers. This interpretation is consistent with the communal model of coping, which posits that catastrophizing strategies are used to secure social or interpersonal resources, as well as induce others to alter their expectations, reduce performance demands, or manage interpersonal conflict [85,86,87]. The communal model of coping is consistent with the collectivistic orientation that is characteristic of many Black cultures [20], wherein members place a higher importance on interpersonal than on intrapersonal outcomes. Consequently, although pain catastrophizing might lead to increased pain at the intrapersonal level – indeed, catastrophizing has been shown to mediate race differences in pain tolerance [31,64] – it may also confer significant advantages at the interpersonal level. This communal coping model interpretation would also be consistent

with findings that Black individuals seek social support more than White individuals. Although we found no significant race differences in seeking social support in the current study, because there were only three effect sizes included in our analysis, we cannot draw strong conclusions at this time. Future studies should further examine race differences in seeking social support as well as other factors that may be indicative of a communal model of coping.

Results of this meta-analysis also indicated that Black individuals attempt to divert attention away from pain and reinterpret pain sensations more than White individuals. Evidence for the effectiveness of these coping strategies is mixed. Some results suggest that diverting and reinterpreting strategies confer benefit, particularly in the short term, by distracting individuals from painful sensations [4;45;54;83], whereas other studies suggest these strategies are associated with increased pain and dysfunction [53;52;75]. These inconsistent findings suggest that the effectiveness of attentional diversion strategies is moderated by other factors such as whether the individual has a clinical pain condition or is otherwise pain-free [83], the duration of pain [62;68;88], and the level of pain catastrophizing [78;13]. In the context of chronic pain in particular, these latter results are consistent with conceptualizing attentional diversion strategies as avoidance techniques that may develop from a fear of pain. Indeed, fear of pain and the resulting avoidance of it have been linked to increased pain intensity, chronicity, and disability [33;42].

The association between avoidance strategies and poor pain outcomes provides support for treatments that encourage acceptance rather than avoidance of pain, such as third wave cognitive behavioral therapies. Indeed, attentional diversion strategies have been specifically contrasted with acceptance-based strategies [67]. There is a growing evidence base for the effectiveness of acceptance approaches. Mindfulness-based Stress Reduction (MBSR; 51) has yielded significant improvements in pain intensity and functional limitations for individuals with arthritis as well as neck and back pain [76]. Likewise, Acceptance and Commitment Therapy (ACT; 40) has been shown to improve pain interference, depression, and pain-related anxiety in individuals with chronic pain [97]. Although these treatment modalities have been shown to improve pain outcomes overall, few studies have specifically examined their efficacy for Black individuals; of those that have, none were focused on pain [23;79;101]. Future research should examine ACT, MBSR, and other third wave therapies in Black individuals with chronic pain and compare the effectiveness of these treatments across racial groups.

Task persistence was the one coping strategy endorsed by White individuals significantly more than Black individuals. Task persistence, as measured by the Chronic Pain Coping Inventory [47], involves continuing on with a task by ignoring painful sensations rather than allowing the pain to interfere with the task at hand. Task persistence has been associated with decreased pain, disability, and depression [74]. Interestingly, a similar pattern (though it did not reach statistical significance) emerged for ignoring strategies, such that White individuals ignored pain sensations more than Black individuals. Although ignoring pain and task persistence are often considered to be distinct strategies, there is overlap in their measurement; for example the task persistence scale of the CPCI contains items related to both ignoring pain sensations and continuing on with tasks. Given this overlap, future

research should examine the advantages and disadvantages – from statistical and conceptual points of view – of keeping these coping strategies separate versus combining them into a single strategy. The conceptualization and measurement of task persistence may need to be refined to exclude aspects of ignoring pain. Such a refinement might allow for a better understanding of the unique and combined effects of ignoring and persistence strategies on the pain experience for White and Black individuals.

Moderation analyses indicated that race differences for general and specific coping strategies were larger for some categorizations of coping. Most notably, race differences were larger for passive compared to active strategies. Effect sizes for hoping/praying and catastrophizing, both of which are passive strategies, were the largest across all the strategies examined and may be driving the overall effect size for passive strategies.

Black individuals may be more prone to engage in passive coping for several reasons. Passive strategies may be more commonly modeled in Black communities. Evidence suggests that Black individuals have a more external locus of control orientation, have a lower overall sense of self-efficacy, and report greater feelings of helplessness [9]. Studies examining race differences for non-pain coping also found that Black individuals engaged in more passive strategies (i.e. avoiding problems, hoping and praying, and denial) [16;55;60;92]. Because passive strategies are minimally effective for pain management, individuals who frequently employ them might conclude that they have limited control over their pain. Such a belief is likely to lead to and/or reinforce a helplessness orientation toward pain. This recursive cycle of passive coping leading to perceptions of helplessness leading to passive coping may partly contribute to the poorer pain outcomes experienced by Black patients [8;21;29;80;82;98]. Race differences in coping strategies may also relate to race differences in pain that have been documented in numerous experimental and clinical studies [37]. Given that passive coping is related to greater pain [10], race differences in pain may be due, in part, to Black individuals' greater inclination to engage in passive strategies as a whole. It is reasonable to speculate that the passive nature of these strategies – not the specific strategy itself – is what influences pain most. If so, perhaps investigations of coping should focus on this broader classification rather than examining individual coping strategies. Such a focus on active versus passive categories might confer advantages for conceptualization of pain coping, as well as its measurement.

For the most part, sample age and gender did not moderate the race differences in pain coping, nor did sample type (clinical versus non-clinical), study design (experimental versus non-experimental), and specific coping measure (results for these latter three analyses were not presented). Age was a significant moderator of the relationship between race and catastrophizing, such that race differences in catastrophizing decreased as the sample age increased. This could be related to the general decrease in catastrophizing that occurs with advancing age [93]. Additionally, race differences in exercising/stretching increased as the sample percentage of females increased, however there were only two studies that included this coping strategy, thus the reliability of this finding is uncertain. These two moderation results should be interpreted cautiously. Because demographic variables were reported inconsistently across studies, future work should examine the role of age and gender, as well

as other demographic factors such as socioeconomic status, in the context of race differences in pain coping.

There are several limitations of this meta-analysis. First, studies used a wide range of coping measures, which may have introduced heterogeneity across effect sizes. While many strategies (e.g., catastrophizing, praying, and diverting attention) were consistently included across studies and measures, some strategies (e.g., seeking social support and task persistence) were unique to measures used less frequently, which may limit the generalizability of findings for these strategies. Additionally, many measures confound coping with other reactions to pain [48]. For example, catastrophizing can be considered a pain appraisal rather than (or in addition to) a coping response. Likewise, exercise and stretching may be classified as outcomes or adjustments to pain. It is beyond the scope of this meta-analysis to adjudicate these issues. We included these strategies in the current analyses because they are often conceptualized and measured as coping strategies in research and clinical settings. Nevertheless, research is needed to more clearly define and measure the related constructs of pain coping, appraisals, and outcomes, which will enhance our understanding of their relationships to the pain experience for all patients and for specific patient subgroups. Furthermore, higher levels of pain in Black individuals may be confounded with the race differences observed in pain coping. It was beyond the scope of this meta-analysis to specifically examine this relationship, although our moderation analyses for sample type and study design (discussed above but not included the results section) may inform future studies that specifically consider factors underlying race differences in pain coping. Finally, race differences in coping may be primarily driven by differences in culture, for which race serves as a frequently measured but imprecise proxy. Indeed, Robbins and colleagues [71] suggest that genetically identified ancestral differences account for a small fraction of the variation in pain between White and Black individuals. Unfortunately, we could not address the issue of culture in the current meta-analysis due to lack of data. Additionally, the studies examined in this meta-analysis included samples only from the United States. Our understanding of race and culture in the context of pain would benefit greatly from studies that directly measure specific cultural indicators within more diverse samples.

This meta-analytic review is the first of its kind to quantify the relationship between race and the use of pain coping strategies. Black individuals not only endorsed more frequent engagement in pain coping strategies overall than White individuals but also more frequent use of specific strategies such as hoping and praying and catastrophizing. The largest of these race differences was found for passive coping strategies, which have been associated with poorer pain outcomes. Future research should examine race differences in intra- and inter-personal values and goals in the context of pain, which may lead to better understanding of race differences in pain coping and ultimately to improved culturally-sensitive care for all patients in pain.

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Highlights

- We meta-analyzed differences in pain coping between White and Black Americans
- Black individuals use coping strategies more frequently overall
- Race differences in pain coping are largest for praying and catastrophizing
- Research is needed to better understand the influence of culture in this context

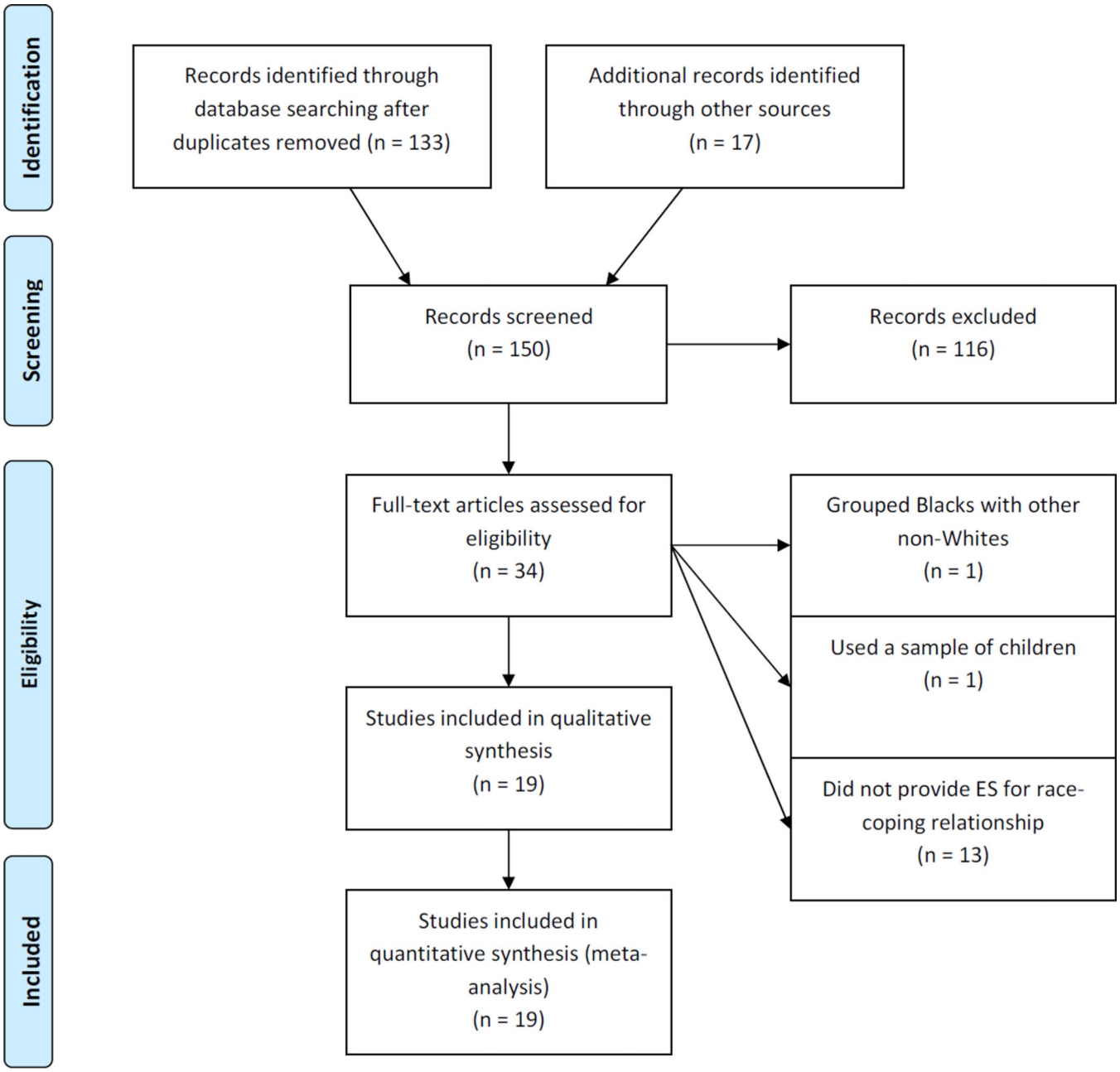

Figure 1.
PRISMA flow diagram of process of identification and screening of articles for inclusion

Table 1

Alternative Search Terms

Pain	Coping	Race
Nociception	Coping Strategies Questionnaire	African American
	Catastrophizing	Black
	Chronic Pain Coping Inventory	Ethnicity
	Coping Self Statements	
	Distraction	
	Diverting Attention	
	Guarding	
	Hoping	
	Ignoring	
	Pain Catastrophizing Scale	
	Pain Coping Inventory	
	Pain coping Questionnaire	
	Praying	
	Reinterpreting Pain	
	Relaxation	
	Seeking Social Support	
	Stone & Neale's Daily Coping Inventory	
	Transformation	
	Vanderbilt Multidimensional Pain Coping Inventory	
	Wishful Thinking	

Table 2

Coping Categorization

Cognitive vs Behavior		Active vs Passive		Problem- vs Emotion-focused	
Cognitive	**Behavioral**	**Active**	**Passive**	**Problem-focused**	**Emotion-focused**
Catastrophizing	Asking for Assistance	Coping Self Statements	Catastrophizing	Asking for Assistance	Catastrophizing
Coping Self Statements	Depending on Others	Diverting Attention	Depending on Others	Depending on Others	Coping Self Statements
Diverting Attention	Exercise and Stretching	Exercise and Stretching	Hoping/Praying	Diverting Attention	Hoping/praying
Hoping/praying	Functioning in Spite of Pain	Functioning in Spite of Pain	Passive Techniques	Exercise and Stretching	Reinterpreting Pain
Ignoring pain	Guarding	Ignoring Pain	Restricting Functioning	Functioning in Spite of Pain	Seeking Support
Reinterpreting Pain	Increasing Behavioral Activity	Increasing Behavioral Activity	Retreating	Guarding	Transformation
Transformation	Reducing Demands	Reinterpreting Pain	Using Medication	Increasing Behavioral Activity	Wishful Thinking
Wishful Thinking	Restricting Functioning	Self-care	Wishful Thinking	Reducing Demands	Worrying
Worrying	Retreating	Task Persistence	Worrying	Relaxation	
	Seeking Support	Transformation		Restricting Functioning	
	Self-care			Retreating	
	Standard Healthcare			Self-care	
	Task Persistence			Standard healthcare	
	Using Medication			Task Persistence	
				Using Medication	

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Table 3

Study Characteristics

Study	Sample Size (Black Participants)	Mean Age	Percent Female	Sample	Coping Questionnaire
Allen et al.[2]	491 (221)	60.12	6.74	Clinical	Stone & Neale's Daily Coping Inventory (SNDCI) adapted for pain
Almeida et al.[3]	194(95)	24.34	48.15	Non-clinical	Pain Catastrophizing Scale (PCS)
Campbell et al.[12]	120(62)	21.07	57.69	Non-clinical	Coping Strategies Questionnaire (CSQ)
Cano et al.[14]	105(43)	53.64	59	Clinical	Coping Strategies Questionnaire-Revised (CSQ-R)
Chibnall & Tait [18]	1475(580)	N/A	37.7	Clinical-Low Back Injury	PCS
Dun et al.[22]	197(38)	76.36	77	Non-clinical	Modified version of the CSQ; Modified version of the Religious Problem-Solving Scale
Edwards et al. [26]	194(97)	45.7	52.6	Clinical	CSQ
Fabian et al.[28]	37(11)	21.5	61.29	Non-clinical	PCS
Forsythe et al.[31]	155(60)	19.47	53.5	Non-clinical	PCS
Golightly et al.[35]	153(59)	61.8	51.6	Clinical- Arthritis	SNDCI adapted for pain; CSQ;
Goodin et al.[36]	114(28)	19.9	50	Non-clinical	PCS
Goodin et al.[unpublished]	114(28)	19.9	50	Non-clinical	CSQ
Hastie et al.[38]	650(287)	21	64	Non-clinical	CSQ-R
Hastie et al.[39]	372(185)	24.63	58.2	Non-clinical	List of pain reducing behaviors
Jones et al.[49]	939(459)	59.35	3.2	Clinical- Arthritis	CSQ
Jordan et al.[50]	100(48)	54.72	100	Clinical- Arthritis	CSQ
McIlvane[63]	175(77)	66.74	100	Clinical - Unspecified	Vanderbilt Multidimensional Pain Coping Inventory (VMPCI; Emotional Approach coping Scale; Catastrophizing subscale of the CSQ; 2 religious items from the SNDCI
Ruehlman et al.[77]	428(214)	53.5	58.4	Clinical - Unspecified	Profile of Chronic Pain: Screen and Extended Assessment
Tan et al.[91]	479(127)	51.2	9.6	Clinical - Unspecified	CSQ

Table 4

Study Effect Sizes

Study	Study SMD	95% CI	Effect
Allen et al.[2]	0.26	0.17–0.34	B>W
Almedia et al.[3]	0.17	−0.11–0.45	B=W
Campbell et al.[12]	0.62	−0.24–1.47	B=W
Cano et al.[14]	0.38	−0.16–0.93	B=W
Chibnall & Tait[18]	0.28	0.14–0.35	B>W
Dunn et al.[22]	0.22	0.12–0.31	B>W
Edwards et al.[26]	0.10	−0.10–0.31	B=W
Fabian et al.[28]	0.89	0.14–1.64	B>W
Forsythe et al.[31]	0.68	0.34–1.01	B>W
Golightly et al.[35]	0.33	0.14–0.53	B>W
Goodin et al.[36]	0.70	−1.20–1.60	B=W
Goodin et al.[unpublished]	0.47	0.29–0.64	B>W
Hastie et al.[38]	0.26	−0.11–0.62	B=W
Hastie et al.[39]	0.17	−0.02–0.36	B=W
Jones et al.[49]	0.07	0.03–0.11	B>W
Jordan et al.[50]	0.06	−0.52–0.64	B=W
McIlvane[63]	0.18	0.05–0.31	B>W
Ruehlman et al.[77]	0.10	−0.18–0.38	B=W
Tan et al.[91]	0.12	0.02–0.21	B>W

B refers to Black individuals

W refers to White individuals

Table 5

Summary of effect sizes for pain coping strategies by categorization

Coping Strategy	k	N	Effect	SMD	95% CI	z	I^2	FSN
Overall	19	6489	B > W	0.25	0.17–0.32	6.35**	46.86	29
Hoping/praying	12	3595	B > W	0.70	0.48–0.92	6.34**	88.89	72
Catastrophizing	17	5307	B > W	0.40	0.26–0.53	5.81**	79.58	51
Diverting Attention	11	2781	B > W	0.20	0.13–0.27	5.32**	0	11
Coping Self-statements	11	3384	B = W	0.08	−0.01–0.17	1.8	34.97	0
Reinterpreting Pain	11	2956	B > W	0.10	0.03–0.18	2.8*	0	0
Ignoring Pain Sensations	10	3209	B = W	−0.09	−0.26–0.08	−1.07	81.05	0
Increasing Behavioral Activity	5	1729	B = W	0.00	−0.11–0.11	−0.02	34.78	0
Exercising and Stretching	2	679	B > W	0.33	0.01–0.65	2.02*	85.16	7
Task Persistence	2	910	W > B	−0.28	−0.41- −0.14	−3.99**	0	4
Guarding	2	679	B = W	0.28	−0.04–0.60	1.72	80.99	4
Relaxation	2	679	B = W	0.23	−0.04–0.50	1.68	46.24	3
Seeking Social Support	3	1029	B = W	0.23	−0.04–0.51	1.66	47.92	4

B refers to Black individuals

W refers to White individuals

* $p < 0.05$

** $p < 0.01$

Table 6

Continuous moderator analyses

		R^2	β	*Z*
Overall	Age	0.18	−0.42	−1.58
	% Female	0.03	0.16	0.72
Hoping/Praying	Age	0.16	−0.40	−1.13
	% Female	0.22	0.47	1.75
Catastrophizing	Age	0.41	−0.64	−3.14*
	% Female	0.01	0.10	0.47
Diverting Attention	Age	0.01	−0.11	−0.23
	% Female	0.29	0.54	1.62
Coping Self Statements	Age	0.23	0.48	1.07
	% Female	0.00	0.02	0.08
Reinterpreting Pain	Age	0.02	0.13	0.21
	% Female	0.17	0.41	1.05
Ignoring	Age	0.01	−0.10	−0.19
	%Female	0.25	−0.50	−1.84
Increasing Behavioral Activity	Age	1.00	−1.00	−1.80
	% Female	0.01	−0.09	0.17
Exercising & Stretching	Age	0.07	−0.26	−0.41
	% Female	0.91	0.96	2.48*

* $p < 0.05$

Table 7

Categorical moderator analyses

Coping Strategy	k	Effect	SMD	95% CI	z
Active	12	B = W	0.03	−0.34–0.10	0.95
Passive	18	B > W	0.53	0.39–0.68	7.28**
Problem-focused	12	B > W	0.14	0.07–0.21	3.86**
Emotion-focused	18	B > W	0.32	0.22–0.40	6.70**
Cognitive	17	B > W	0.29	0.20–0.38	6.19**
Behavioral	8	B = W	0.05	−0.03–0.12	1.30

B refers to Black individuals

W refers to White individuals

* p < 0.05

** p < 0.01